INNOVATION
Beyond Networks

RG-WALL 1600-Z5100-S

Ruijie Cloud-Managed Firewall

Datasheet

01 Product Overview

Introduction

As new hot spots such as social networking, cloud computing, and big data have emerged, the Internet has entered an unprecedented era of prosperity. However, the information security problems accompanied have become increasingly complex, bringing huge challenges to the traditional security construction model. Drawing on years of technological expertise and in line with the development trend of next-generation firewalls, Ruijie Networks has unveiled the RG-WALL 1600-Z5100-S series cloud-managed firewall to cater for ever-changing demands of today's market. This firewall can be installed on a standard 19-inch rack and features high performance and flexible expansion.

Product Features and Benefits

The RG-WALL 1600-Z5100-S series firewalls use a DPDK-based high-performance network forwarding service platform to provide intelligent quick deployment, active asset discovery, intelligent policy manager, one-click fault analysis, and service health diagnosis, simplifying device deployment and O&M. They have rich security functions, including intrusion prevention, antivirus, port scan, traffic learning, application control, and defense against DoS/DDoS attacks. They also support unified management on the cloud platform, data synchronization to the cloud for analysis and reporting, remote monitoring and O&M, policy translation for device replacement, batch configuration, and automatic inspection.

In addition, you can expand the performance of the RG-WALL 1600-Z5100-S series firewalls by purchasing performance licenses.

Firewall Throughput	Firewall (Traffic Mix)	IPS	NGFW	Threat Protection	Port
15 Gbps	3–10 Gbps	1.8–4 Gbps	1.6–3.5 Gbps	1–2 Gbps	8 x 10/100/1000BASE-T ports 2 x 1GE SFP ports 4 x 10GE SFP+ ports
Combination of product and performance licenses: 3 Gbps: RG-WALL 1600-Z5100-S chassis 3–10 Gbps: RG-WALL 1600-Z5100-S chassis + 1/2/3/4/5/6/7 RG-WALL 1600-Z5100-S-1G-LIC performance licenses					

Applicable Industries and Scenarios

The RG-WALL 1600-Z5100-S can be deployed at an Internet egress, area boundary, and data center boundary, as well as for branch uplink.

02 Product Appearance

Front Top View of the RG-WALL 1600-Z5100-S

Rear Top View of the RG-WALL 1600-Z5100-S

Appearance Design

- The RG-WALL 1600-Z5100-S adopts a brand new security product design style of Ruijie Networks. The symmetrical, concise, octagonal-corner appearance reflects simplicity and high reliability.
- The octagonal corners are user-friendly.
- The unique mounting bracket design allows rapid deployment, simplifying the installation process. In a complex equipment room environment, only one person is needed to complete the device installation and securing processes.

Hardware Security

Different from common software-based defense, the RG-WALL 1600-Z-S series firewall implements attack defense by using an exclusive built-in anti-DoS/DDoS component on the CPU. This significantly improves the DoS/DDoS attack defense performance and enables more robust and secure networks.

All-New Hardware Design, Higher Reliability

A voltage or grid exception may incur a storage component failure. To cope with this risk, add monitoring and spare components on the firewall to enhance the capability of storage components to withstand shocks, thereby reducing device damages and data loss.

03 Product Highlights

- High performance and scalability: With license-based scalability, the firewall can provide up to 10 Gbps throughput.
- The five-in-one firewall license (IPS, AV, APP, and URL signature libraries and one-year threat intelligence services) enables one firewall to offer comprehensive security defense.
- The firewall has an exclusive built-in anti-DoS/DDoS component on the CPU.
- The firewall features industry-leading multi-core lock-free design and the new NTOS operating system.
- Port scan and traffic learning allow users to complete firewall onboarding without professional knowledge.
- In the industry-first policy simulation space, you can foresee the effects of security policy adjustment, realizing zero-risk policy optimization.
- By transforming the troubleshooting capabilities of senior engineers into product functions, the firewall provides you with a one-stop troubleshooting wizard.
- Simple cloud O&M allows you to manage network and security devices on the entire network on a mobile app.

04 Product Features

AI-based Security of the Z Series Firewall

Traditional machine learning requires manual feature extraction, and some deep learning methods can extract only local features of domain name information but ignore contextual features between domain name characters. A single neural network model such as convolutional neural network (CNN) is used, which is insensitive to the input time order. The RG-WALL 1600-Z-S series firewall integrates domain name allowlist intelligence, rule filter, and convolutional recurrent neural network (CRNN) multi-level detection algorithm, addressing the problems of inaccurate and inefficient algorithms on traditional devices.

- Models are regularly updated based on self-learning. In this way, model-based detection is more accurate and can adapt to new Domain Generation Algorithms (DGAs).
- Word embedding is applied in the data pre-processing phase, resolving the problems of sparse matrix and curse of dimensionality in one-hot encoding.
- The CRNN algorithm enables large models and many parameters to be computed on embedded devices, greatly improving prediction efficiency.

Unified Security Defense

The RG-WALL 1600-Z-S series firewall integrates comprehensive security defense functions, meeting

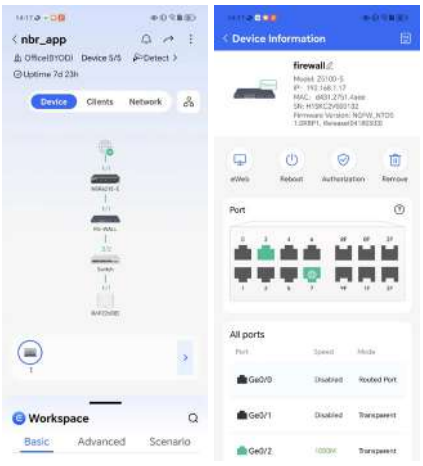
classified protection requirements on the firewall, antivirus, and intrusion prevention. Specifically, it provides DoS/DDoS attack defense against SYN, UDP, and ICMP flood attacks, ARP attack defense, detection and defense of attacks using common protocols including HTTP, TCP, UDP, DNS, and TLS, as well as various threats including spoofing, injection, and man-in-the-middle attacks, cross-site request forgery, cross-site scripting, code execution, and use after free (UAF) vulnerabilities. The virus protection function integrates a large number of virus protection signature libraries and supports dual-engine scan, enabling both quick scan and deep scan.

Simple Cloud O&M, Remote Device Commissioning

Administrators can remotely manage and control the firewall through Ruijie Cloud. Device configurations can be delivered uniformly, and device monitoring and other routine O&M functions can be implemented remotely.

Integrated Implementation and O&M on Ruijie Reyee App

You can use Ruijie Reyee App to perform quick onboarding and follow-up O&M of the firewall on a mobile phone. In addition, configurations can be delivered on this app, greatly improving the efficiency of implementation and O&M.



Hot Upgrade/Recovery

Hot patches can be installed in seconds to upgrade forwarding components, management components, and some system components and restart these components without affecting device running. This greatly improves the maintainability and stability of the device.

If the forwarding component encounters an exception during device running, second-level automatic hot restart can be performed, without manual discovery and device restart for recovery. The forwarding recovery time is reduced from minutes or even hours to seconds, which greatly reduces the impact on normal services of users.

Intelligent Service Diagnostic Center

Fault Analysis
The RG-WALL 1600-Z-S series firewall is developed to transform the troubleshooting capabilities of senior engineers into product functions and provides you with a one-stop troubleshooting wizard. In the diagnostic center, automatic troubleshooting can be conducted based on the paths that clients use to access target resources, and fault information and handling suggestions are displayed. This greatly improves the efficiency of troubleshooting and saves additional expenses for troubleshooting.

Packet Tracing
In the diagnostic center, you can also analyze and trace packet processing of each security service module on the device, and check detailed information of packet tracing records to accelerate network fault troubleshooting and locating.

Port Scan and Traffic Learning, Simple Firewall Onboarding

Onboarding Configuration
To perform firewall onboarding, you can conduct Port Scan to automatically identify the IP address and port number of a service system, and then enable Traffic Learning to automatically detect the service access relationship on the live network. You can also generate access control policies based on ports with one click, and complete firewall onboarding without professional knowledge.

Server Port Check
In routine O&M, server ports need to be checked to meet high security requirements and formulate refined security policies. In traditional mode, server ports need to be manually verified with the customer, which takes a long time. With port scan and traffic learning, this process can be completed in one day, which greatly improves efficiency and lowers technical thresholds.

Policy Simulation Space to Foresee Effects, Zero-Risk Policy Adjustment

You can add, delete, and modify a policy in the simulation space, use the policy to match the real traffic to analyze the difference in traffic matching before and after the policy adjustment, and adjust the policy accordingly. In this way, policies can be adjusted without service interruption, and O&M personnel do not need to stay up late to adjust policies in off-peak hours. The risk of policy adjustment is minimized, and refined policy adjustment can be achieved.

New NTOS Operating System, High Efficiency

The firewall adopts an advanced multi-core lock-free design. Typically, a firewall has multiple CPUs. Without lock-free design, when multiple CPUs compete for data from a common memory pool for processing, a CPU obtains data and locks it, and the other CPUs can process the data only after it is unlocked, resulting in low efficiency. The Z-S series firewall uses the industry-leading multi-core lock-free design, and designates an independent space in the memory for each CPU. The CPU can obtain data from the designated memory space, so data does need to be locked and no conflict will occur. Data is also stored independently. For example, data from the same IP address source is stored in one memory unit and is processed by the same CPU. This multi-core lock-free design is applied at each of the four layers of the TCP/IP model, significantly improving efficiency.

Dual Power Supplies, High Availability

The firewall supports dual power supplies, ensuring uninterrupted security defense at the network edge. The dual-power design supports automatic switchover. When a power module fails, the system seamlessly switches to the other power module, preventing service interruption and ensuring service continuity. This not only reduces potential loss due to downtime, but also enhances the reliability and security of the entire system. The power redundancy design also helps reduce maintenance costs. The dual power supplies decrease the urgent maintenance needs caused by power failures and prolong the normal operation time of the firewall, thereby lowering the frequency and complexity of maintenance work as well as saving resources and costs.

05 Product Specifications

Product Performance

Firewall Throughput[4]	Firewall (Traffic Mix)	IPS[1]	NGFW[1,2]	Threat Protection[1,3]
15 Gbps	3 Gbps	1.8 Gbps	1.6 Gbps	1 Gbps
15 Gbps	4 Gbps	2.1 Gbps	1.7 Gbps	1.14 Gbps
15 Gbps	5 Gbps	2.4 Gbps	1.8 Gbps	1.28 Gbps
15 Gbps	6 Gbps	2.7 Gbps	1.9 Gbps	1.42 Gbps
15 Gbps	7 Gbps	3 Gbps	2.1 Gbps	1.56 Gbps
15 Gbps	8 Gbps	3.3 Gbps	2.2 Gbps	1.7 Gbps
15 Gbps	9 Gbps	3.6 Gbps	2.3 Gbps	1.8 Gbps
15 Gbps	10 Gbps	4 Gbps	3.5 Gbps	2 Gbps

Combination of product and performance licenses:
3G: RG-WALL 1600-Z5100-S chassis
4G: RG-WALL 1600-Z5100-S chassis + 1 RG-WALL 1600-Z5100-S-1G-LIC performance license
5G: RG-WALL 1600-Z5100-S chassis + 2 RG-WALL 1600-Z5100-S-1G-LIC performance licenses
6G: RG-WALL 1600-Z5100-S chassis + 3 RG-WALL 1600-Z5100-S-1G-LIC performance licenses
7G: RG-WALL 1600-Z5100-S chassis + 4 RG-WALL 1600-Z5100-S-1G-LIC performance licenses
8G: RG-WALL 1600-Z5100-S chassis + 5 RG-WALL 1600-Z5100-S-1G-LIC performance licenses
9G: RG-WALL 1600-Z5100-S chassis + 6 RG-WALL 1600-Z5100-S-1G-LIC performance licenses
10G: RG-WALL 1600-Z5100-S chassis + 7 RG-WALL 1600-Z5100-S-1G-LIC performance licenses

System Performance and Capacity	RG-WALL 1600-Z5100-S
Firewall throughput of IPv4 packets (1518-byte UDP packets)[4]	15 Gbps
Firewall throughput (packets per second)	2.3 Mpps
Concurrent sessions (TCP)	1000000
New sessions/second (TCP)	134000
Firewall policies	4000
SSL VPN throughput (1392-byte)	3 Gbps
Concurrent SSL VPN users (recommended maximum, tunnel mode)	1000
Application control throughput (HTTP 64K)[2]	10 Gbps
IPsec VPN throughput (512-byte)	4 Gbps
Gateway-to-Gateway IPsec VPN Tunnels	1000

Note:
All performance values are the maximum values and may vary depending on system configuration.
1. The performance values of IPS (mixed traffic), application control, NGFW, and threat protection are measured with logging enabled.
2. NGFW performance is measured with firewall, IPS, and application control enabled.
3. Threat protection performance is measured with firewall, IPS, application control, and malware protection enabled.
4. Firewall throughput is the maximum forwarding performance (1518-byte UDP packets) of hardware.

Hardware Specifications

Hardware Specifications	RG-WALL 1600-Z5100-S
Dimensions and Weight	
Product dimensions (W x D x H)	440 mm x 300 mm x 43.6 mm (17.32 in. x 11.81 in. x 1.72 in.)
Shipping dimensions (W x D x H)	545 mm x 450 mm x 130 mm (21.46 in. x 17.72 in. x 5.12 in.)
Product weight	4.44 kg (9.79 lbs)
Shipping weight	5.7 kg (12.57 lbs)
Form factor	1 RU rack
Port Specifications	
Fixed service port	8 x 10/100/1000BASE-T ports 2 x 1GE SFP ports 4 x 10GE SFP+ ports
Fixed management port	1 x RJ45 MGMT port (reusing Ge0/0) 1 x RJ45 console port (RS-232)
USB port	2 x USB 2.0 ports
Storage Specifications	
Hard disk	No hard disk for factory delivery. A 1 TB SATA hard drive can be added.
Power Supply and Consumption	
Power supply	2 x pluggable power modules (one power module for factory delivery) • Rated input voltage: 100–240 V; 50–60 Hz • Rated input current: 2 A (maximum)
Max. Power Consumption	< 60 W
Environment and Reliability	
Operating temperature	0°C to 45°C (32°F to 113°F)
Storage temperature	–40°C to +70°C (–40°F to +158°F)
Operating humidity	40% RH to 65% RH (non-condensing)
Storage humidity	10% RH to 90% RH (non-condensing)

Hardware Specifications	RG-WALL 1600-Z5100-S
Noise level	36 dB
Operating altitude	0–5000 m (0–16404 ft.)
Compliance	EMC SZEM2404002506ATV LVD SZES2404002242AT

Software Specifications

Software Specifications	RG-WALL 1600-Z-S Series
Network	
Physical interface	Configuring interfaces as LAN/WAN interfaces; three modes for WAN interfaces: PPPoE, DHCP, and static IP; configuring the routing, transparent, or bypass mode for interfaces
Sub-interface	Configuring sub-interfaces and VLAN IDs
Bridge interface	Configuring interfaces in transparent mode as bridge interfaces
Aggregate interface	Configuring aggregate interfaces
Routing	IPv4/IPv6 static and dynamic routing, routing policy, Policy-based Routing (PBR), ISP address library-based routing, application-based routing, and egress load balancing
DHCP server	DHCP server functions
DNS server	Configuring DNS addresses for devices
DDNS	Multiple DDNS service providers supported
Link detection	Link detection and link detection logs
VPN	SSL VPN and IPsec VPN
VRRP	VRRP functions
Object	
Address and address group	Configuring IPv4/IPv6 address objects in IP address/range format
Zone	Configuring security zones
Application and application group	Configuring application types in application/application group mode
Service and service group	Configuring service objects; common default port services supported
Time plan	Configuring time objects; one-off time plans and cyclic time plans supported
ISP address library	Default ISP address libraries: China Telecom (CHN), China Mobile (CHN), China Unicom (CHN), CERNET (CHN), and Beijing Teletron (CHN); customizing, importing, and exporting ISP address libraries
Virus protection template	Configuring content object templates; antivirus (AV) templates supported; configuring quick scan or deep scan; configuring templates based on protocols and directions; setting excluded viruses
Intrusion prevention template	Configuring content object templates; predefined Intrusion Prevention System (IPS) templates supported; customizing IPS templates; configuring rule filters based on objects, severity, protocols, and threat types; setting excluded rules
File filtering	Configuring content object templates; file filter templates (filtering by file type) supported
URL filtering	URL filtering
SSL proxy certificate	Adding, importing, deleting, viewing, and downloading SSL proxy certificates; configuring a global SSL proxy certificate
Server certificate	Importing, deleting, viewing, and downloading server certificates
Security rule base	Viewing default security rules in the IPS security library

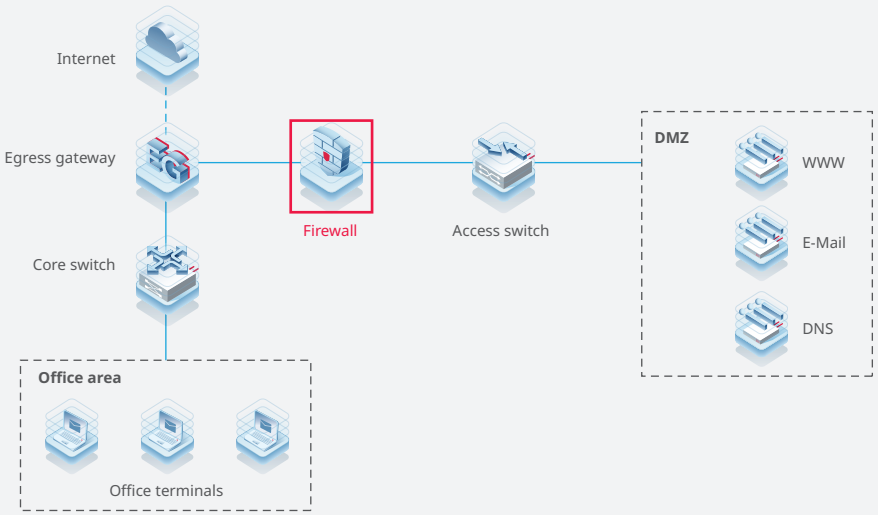
Software Specifications	RG-WALL 1600-Z-S Series
Content identification	URL category and keyword configuration
User authentication	User management, user import, authentication server configuration, real-name user information synchronization, and authentication policy configuration
Policy	
Traffic learning	Traffic learning to record destination IP addresses and port numbers as well as abnormal traffic; exporting traffic learning logs
Network address translation (NAT)	NAT; configuring NAT policies; importing NAT policies in a batch; common NAT application-level gateway (ALG) services; server port mapping; viewing NAT address pool status
Security policy	Configuring security policies; customizing policies based on parameters including objects, contents, and zones; viewing the policy list; importing security policies in a batch
Policy simulation	Simulating policy execution in the simulation space to check whether uncertain security policies can achieve expected effects
Policy configuration wizard	Security policy configuration wizard for conducting port scan, performing configurations, testing configurations, and other steps to generate security policies
Policy optimization	Sorting out configured security policies and analyzing policies to identify redundant, expired, and conflicting policies
Policy lifecycle	Full lifecycle display of security policies, including detailed records of policy changes
Port scan	Port scan of configured IP ranges for all ports or selected ports; policy creation prompt for scan results
DoS/DDoS attack defense	Different DDoS attack defense policies in security defense
ARP attack defense	Preventing ARP attacks including ARP spoofing and ARP flooding in security defense
Local defense	Configuring local defense policies in security defense
Threat intelligence	Enabling or disabling threat intelligence; customizing threat intelligence; managing excluded threats
Blocklist and allowlist	Configuring global blocklists and allowlists
SSL proxy policy	Configuring SSL proxy policies; customizing policies based on parameters including objects, contents, and zones; viewing the policy list
SSL proxy template	Configuring SSL proxy templates; setting the template type to protecting client or server
Allowlist	Configuring domain name allowlists and application allowlists
Behavior analysis	Configuring analysis policies, templates, and allowlists
System	
Simple Network Management Protocol (SNMP)	Connecting to third-party platforms for management through SNMPv1/v2/v3
Patch installation	Downloading and installing patches for upgrade
Cloud management platform	Enabling or disabling unified management on the cloud management platform; log upload to the cloud
One-click collection	Collecting fault information with one click
Device health	Device health diagnosis
Service diagnosis	Service continuity diagnosis
System upgrade	System upgrade and rollback
Database backup	System database backup and restoration
Factory settings restoration	Restoring factory settings on the web UI

06 Typical Applications

Security Defense at Area Boundary

The RG-WALL 1600-Z-S series firewall can be deployed at an area boundary to meet LAN application requirements, improve information security, and guarantee LAN service security. The firewall can bring the following benefits:

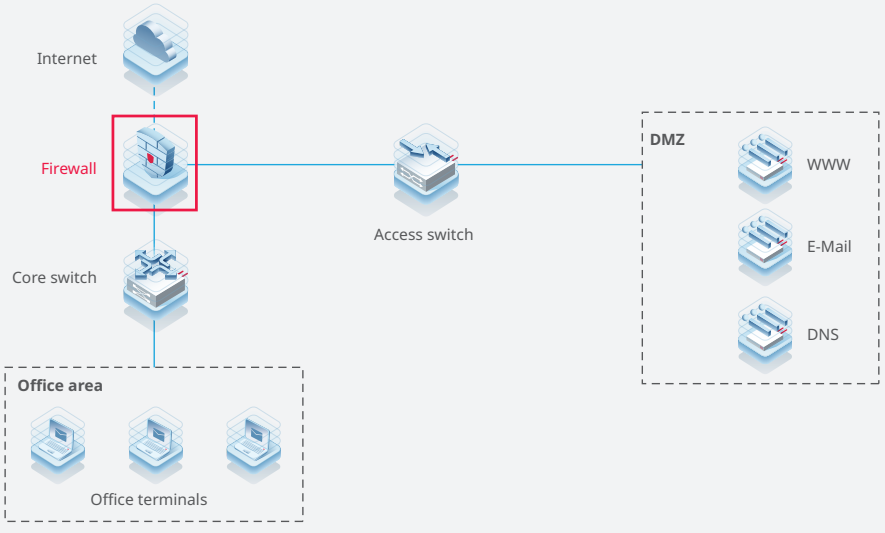
- Generate refined access control policies based on servers.
- Effectively defend against external attacks and viruses to protect key services of enterprises.
- Help users identify and control applications.



Small and Medium-Sized Internet Egress

The RG-WALL 1600-Z-S series firewall can satisfy the needs of small and medium-sized Internet egress, improve information security, and guarantee egress network security. The firewall can bring the following benefits:

- Meet the needs of small and medium-sized Internet egress scenarios.
- Effectively defend against external attacks and viruses to protect key services of users.
- Help users identify and control applications.



07 Ordering Information

Model	Description
RG-WALL 1600-Z5100-S	The RG-WALL 1600-Z5100-S cloud-managed firewall provides 8 x 1GE ports, 2 x 1GE SFP ports, 4 x 10GE SFP+ ports, and one power module (for factory delivery). The firewall is 1 RU high and supports expansion of 1 TB enterprise-class SATA hard drive.
RG-WALL 1600-Z5100-S-1G-LIC	Performance expansion license for the RG-WALL 1600-Z5100-S cloud-managed firewall: One license provides expansion of 1 Gbps network throughput. For each device, up to seven licenses can be added to achieve 10 Gbps network throughput.
RG-WALL 1600-Z1500-S-LIS-E-1Y	Five-in-one license for the firewall: One license provides one-year upgrade services for IPS, AV, APP, and URL signature libraries and one-year threat intelligence services.
RG-NSEC-HDD-1T	1 TB enterprise-class SATA hard drive can be added on the Z series firewall to meet hard disk configuration requirements.
RG-PA70I	Power module, which can be added as required to provide power redundancy.

08 Ordering Guide

The RG-WALL 1600-Z5100-S firewall provides two 1GE SFP ports and four 10GE SFP+ ports. The following table lists the optional optical transceivers.

Model	Description
MINI-GBIC-SX-MM850	1G SR module, SFP form factor, LC, 550 m (1,804.46 ft.) over MMF
MINI-GBIC-LX-SM1310	1G LX module, SFP form factor, LC, 10 km (32,808.40 ft.) over SMF
Mini-GBIC-GT	1G SFP copper module, SFP form factor, RJ-45, 100 m (328.08 ft.) over Cat 5e/6/6a
MINI-GBIC-LH40-SM1310	1G LH module, SFP form factor, LC, 40 km (131,233.60 ft.) over SMF
XG-SFP-LR-SM1310	10G LR module, SFP+ form factor, LC, 10 km (32,808.40 ft.) over SMF
XG-SFP-ER-SM1550	10G ER module, SFP+ form factor, LC, 40 km (131,233.60 ft.) over SMF
XG-SFP-AOC1M	10G SFP+ AOC cable, 1 m (3.28 ft.)
XG-SFP-AOC3M	10G SFP+ AOC cable, 3 m (9.84 ft.)
XG-SFP-AOC5M	10G SFP+ AOC cable, 5 m (16.40 ft.)

09 Package Contents

Item	Quantity
RG-WALL 1600-Z5100-S chassis (with the nameplate at the bottom)	1
Power cord	1
Yellow/Green grounding cable	1
Rubber pad	4
L-shaped mounting bracket	2
M4 x 8 mm cross recessed countersunk head screw	8
Console cable	1
Network cable	1
Warranty Card	1
User Manual	1

10 Warranty Information

For more information about warranty terms and period, visit the official Ruijie website or contact your local sales agency:

- Warranty terms: https://www.ruijienetworks.com/support/servicepolicy
- Warranty period: https://www.ruijienetworks.com/support/servicepolicy/Service-Support-Summany/

Note: The warranty terms are subject to the terms of different countries and distributors.

11 More Information

For more information about Ruijie Networks, visit the official Ruijie website or contact your local sales agency:

- Ruijie Networks official website: https://www.ruijienetworks.com/
- Online support: https://www.ruijienetworks.com/support
- Hotline support: https://www.ruijienetworks.com/support/hotline
- Email support: service_rj@ruijienetworks.com

Ruijie Networks Co., Ltd.

For more information, visit www.ruijienetworks.com or call 86-400-620-8818.